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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/801,442 | 03/16/2004 | Mutsuo Morikado | 790001-2045 | 2001 |

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FROMMER LAWRENCE & HAUG
745 FIFTH AVENUE- 10TH FL.
NEW YORK, NY 10151

| EXAMINER | |
|---|---|
| FENTY, JESSE A | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2815 | |

DATE MAILED: 12/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/801,442 | MORIKADO, MUTSUO | |
| | Examiner | Art Unit | |
| | Jesse A. Fenty | 2815 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *03 October 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) *14-19* is/are withdrawn from consideration.

5)☒ Claim(s) *7-13* is/are allowed.

6)☒ Claim(s) *1 and 4-6* is/are rejected.

7)☒ Claim(s) *2* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Election/Restrictions*

1. Pursuant to the procedures set forth in the Official Gazette notice dated March 26, 1996 (1184 O.G. 86), claim 14, directed to the process of making the patentable product, previously withdrawn from consideration as a result of a restriction requirement, will be rejoined and fully examined for patentability under 37 CFR 1.104 if the claim from which it depends is found to be allowable. MPEP 821.04.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claim 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matthew et al. (US 2003/0151077 A1) in view of Lee (U.S. Patent No. 6,885,055 B2).

In re claim 1, Mathew (esp. Figs. 8-9) discloses a semiconductor device, comprising:

a projecting second semiconductor layer (18) which is formed on a first semiconductor layer (12);

third and fourth semiconductor layers (18) which are formed on the first semiconductor layer to be in contact with the second semiconductor layer and oppose each other via the second semiconductor layer;

a gate electrode (28) which is in contact with the second semiconductor layer with a gate insulating film (26) interposed therebetween and forms a channel in the second semiconductor layer; and

an insulating film (14) which is formed in the first semiconductor layer located immediate under the third and fourth semiconductor layers, the third and fourth semiconductor layers being isolated from the first semiconductor layer by the insulating film.

Matthew does not expressly disclose the second semiconductor layer being in contact with a region included in the first semiconductor layer and surrounded by the insulating film. Lee (e.g., Fig. 3b) discloses a second semiconductor layer (4) being in contact with a region included in the first semiconductor layer (2b) and surrounded by the insulating film. It would have been obvious for one skilled in the art at the time of the invention to connect the second semiconductor layer of Matthew to the first semiconductor layer as disclosed by Lee for the purpose, for example, of improving device characteristics such as improving the floating body effect or dissipating heat more effectively (Lee; column 6, lines 11-26).

In re claim 4, Mathew discloses the device of claim 1, wherein the gate electrode is formed so its ends oppose each other via the second semiconductor layer in a

direction perpendicular to a direction in which the third and fourth semiconductor layers oppose each other.

5. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matthew in view of Lee (as above) and further in view of Nagasaka et al. (U.S. Patent No. 6,300,683 B1).

In re claim 5 and 6, Matthew in view of Lee discloses the devices of claims 1 and 7 respectively, but does not expressly disclose a deep trench capacitor device coupled thereto. Nagasaka discloses a semiconductor memory device with deep trench capacitor coupled to a MOS transistor comprising:

a cell capacitor which is formed on a semiconductor layer and whose storage node (55) electrode is connected to a source/drain region (61) wherein the cell capacitor comprises

a trench which is formed in a first semiconductor layer,

the storage node electrode (55) which fills the trench with a capacitor insulating film (54) interposed therebetween, and

a plate electrode which is formed in a region around the trench in the first semiconductor layer.

It would have been obvious for one skilled in the art at the time of the invention to combine the teachings of Nagasaka and Lee to form a deep trench capacitor with a Fin FET device for the purpose, for example, of enhancing the transistor characteristics

such as driving larger drain current and threshold voltage of Fin FET transistors (teaching reference Fischer et al. (US 2004/0229424 A1; sections [0013] – [0015]).

### *Allowable Subject Matter*

6. Claim 2 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. Claims 7-13 are allowed.

### *Response to Arguments*

8. Applicant's amendments and arguments regarding claims 1 and 7 were persuasive to overcome the rejections of Lee, Inaba and Matthew.

9. Applicant's arguments with respect to claims 1, 4, 5 and 6 have been considered but are moot in view of the new ground(s) of rejection.

### *Conclusion*

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

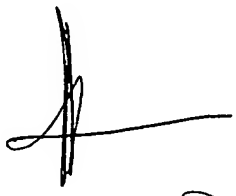
mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse A. Fenty whose telephone number is 571-272-1729. The examiner can normally be reached on 5/4-9 1st Fri. Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 571-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jesse A. Fenty
Examiner
Art Unit 2815



SPE Kenneth Parker
TC2800